

THREE NEW SPECIES OF *PROPALLENE* (PYCNOGONIDA: CALLIPALLENIDAE) FROM AUSTRALIAN WATERS

by DAVID A. STAPLES*

Summary

STAPLES, D. A. (1979) Three new species of *Propallene* (Pycnogonida: Callipallenidae) from Australian waters. *Trans. R. Soc. S. Aust.* **103**(4), 85-93, 31 May, 1979.

Three species of the genus *Propallene* are described; *P. saengeri* sp. nov. from Queensland, *P. cyathus* sp. nov. and *P. vagus* sp. nov. from Victoria. Ecological notes are provided for two species indicating that both utilize ocean currents as a means of dispersal. The occurrence of cement gland ducts on segments additional to the femur is recorded for the first time in the genus.

Introduction

In his revision of the Genus *Propallene*, Stock (1975) recorded its distribution as Japan, southeastern Asia, southern and southeastern Africa, Madagascar and Sierra Leone. Three new species described here increase the total to ten and establishes a new record from Australian waters. The Australian material is recorded from the shallow waters of two diverse regions: the tropical waters of Queensland in the north, and the southern temperate waters of Victoria. *Propallene saengeri* was collected using a Van Veen Grab during benthic surveys at the mouth of the Calliope River, Gladstone, Queensland, for the Queensland Electricity Generating Board; *P. cyathus* was collected using S.C.U.B.A. during an offshore benthic survey for the Latrobe Valley Water and Sewerage Board southwest of Seaspray on the Ninety Mile Beach, and *P. vagus* was collected using S.C.U.B.A. in the vicinity of Port Phillip Heads. Institutions in which type material has been lodged are referred to by the following abbreviations: National Museum of Victoria (N.M.V.); Tasmanian Museum and Art Gallery (T.M.); Queensland Museum (Q.M.); Western Australian Museum (W.A.M.); Institute of Taxonomic Zoology, (Zoölogisch Museum, Amsterdam (Z.M.A.)).

Family: CALLIPALLENIDAE

Propallene cyathus sp. nov.

FIG. 1A-P, FIG. 2A-B

Specimens Examined; *Holotype*: ♂ (ovig.) N.M.V. K43, 1 km offshore, southwest of Sea-

spray, Bass Strait, Vic.: depth 13 m, coll. J. E. Watson 15.iiv.77. *Allotype*: ♀ N.M.V. K44, 1 km offshore, southwest of Seaspray, Bass Strait, Vic.: depth 13 m, coll. N. W. Watson 16.xi.77. *Paratypes*: W.A.M. 1 ♂ 78/579, 1 ♂ 78/580, 1 ♂ 78/581, 1 ♀ 78/582, 1 ♀ 78/583, 1 ♀ 78/584; 3 ♂ 3 ♀ Q.M. S205; 3 ♂ 3 ♀ T.M. J1353; 3 ♂ 3 ♀ N.M.V. K45; 3 ♂ 3 ♀ Z.M.A. Pa2838; 245 ♂, 87 ♀, 32 juveniles lodged in private collection of author.

Description: Trunk segmented, arched, lateral processes separated by less than own diameter. In male, lateral processes longer than trunk diameter. In female, lateral processes equal to, or longer than, diameter of trunk. Each lateral process bears row of 2-3 (or 4) very small spinules on mid-dorsal surface; distally each process bears further 2-3 slightly larger spinules. Abdomen implanted between 4th pair of lateral processes and directed somewhat ventrally, tapering distally. Ocular tubercle low, rounded, eyes indistinctly pigmented; lateral sense organs present.

Chelifores: Scape one-segmented; both fingers curved, gaping when closed, movable finger with 6-10 teeth, immovable finger with 5-8 teeth, palm with several long setae.

Palps only present in male; oriented ventrally, consisting of short unarmed basal part and robust claviform distal segment. Length of distal segment 6-7 times its proximal diameter and expands dorsally to maximum width of slightly less than 2.5 times proximal diameter at about one-half its length. Terminally this segment bears dense lateral fringe of curved

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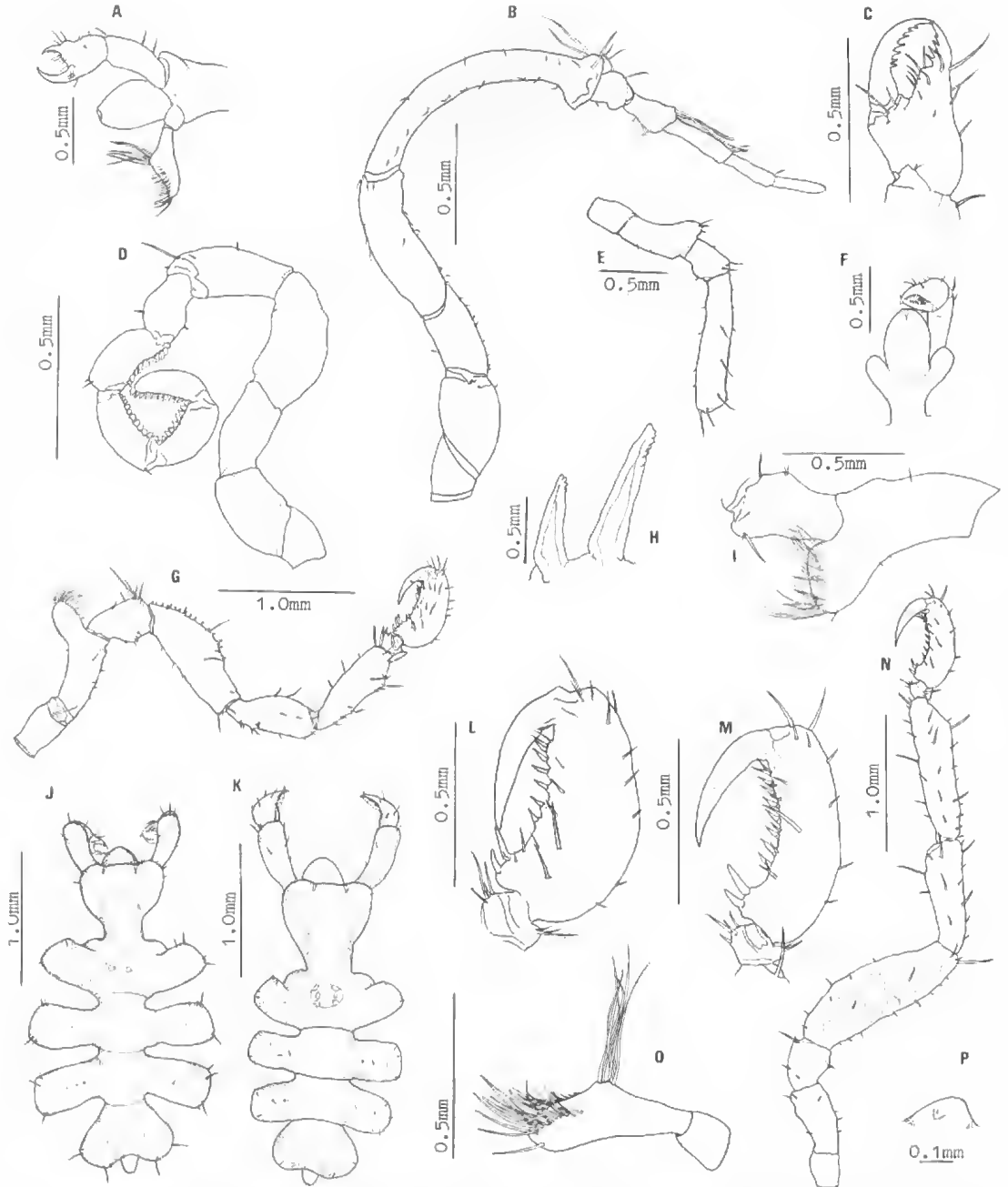


Fig. 1. *Propallene cyathus* sp. nov. A, Cephalic region, lateral view, male; B, Oviger, male; C, Chela, male; D, Oviger, female; E, Proximal segments, leg 4, juvenile male; F, Cephalic region, ventral view, juvenile male; G, Leg 4, male; H, Propodal heel spines, female; I, Coxa 2, 3, leg 4, male; J, Trunk of male, dorsal; K, Trunk of female, dorsal; L, Distal leg segments, male; M, Distal leg segments, female; N, Leg 3, female; O, Palp, male; P, Ocular tubercle, female.

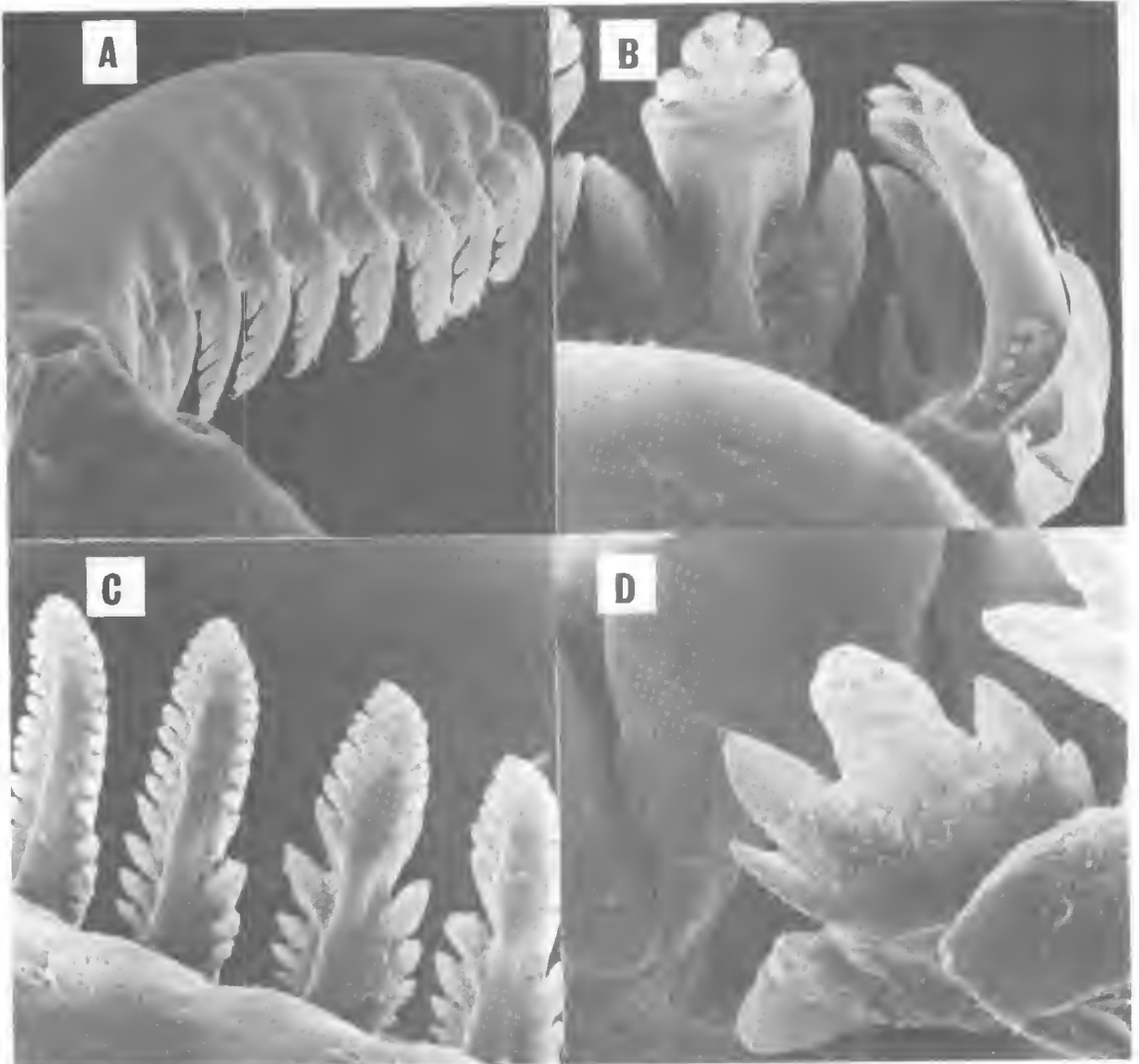


Fig. 2. A, *Propallene cyathus* sp. nov. Compound oviger spines on tenth segment of ♂ oviger (x880). B, *Propallene cyathus* sp. nov. Terminal compound oviger spines on tenth segment of ♀ oviger (x2400). C, *Propallene vagus* sp. nov. Compound oviger spines 5-8 on ninth segment of ♂ oviger (x1100). D, *Propallene saengeri* sp. nov. Terminal compound oviger spine on tenth segment of ♂ oviger (x2200) (S.E.M. photographs).

setae which progressively increase in length along distal margin. Overall formation of these setae resemble a scoop or ladle-like appearance. Specific name alludes to this feature. A group of very long setae, approximately 5 times proximal diameter of palp, originates from mid dorsal region.

Oviger 10-segmented, without terminal claw. In male, segment 5 longest; segments 3, 4 and 5 armed with recurved spinules; distally fifth segment bears setiferous apophysis and well developed process opposite. Compound spines polymorphous (Fig. 2. A), proximal spines

bear 7-9 lateral teeth on either side, basal 1 or 2 pairs of teeth heavily sclerotized; distal spines shorter and more robust, terminal spine particularly broad and bears 2-3 very heavily sclerotized basal teeth on either side (Fig. 2. B). Compound spine formula varies considerably between individuals. Spine formula occurring on segments 7-10 in holotype is 8:11:10:14. Segment 7 armed with 3 very long setae reaching beyond segment 8. Female oviger lacking recurved spinules, segment 4 longest, setiferous apophysis and opposing process lacking on segment 5. Compound spine

formula of allotype for segments 7-10 is 9:11:9:11; shape of compound spines as in male.

Measurements of oviger segments (mm): 1 ♂ .2, ♀ .16; 2 ♂ .25, ♀ .28; 3 ♂ .27, ♀ .2; 4 ♂ .59, ♀ .32; 5 ♂ .9, ♀ .25; 6 ♂ .14, ♀ .18; 7 ♂ .17, ♀ .24; 8 ♂ .25, ♀ .23; 9 ♂ .2, ♀ .21; 10 ♂ .18, ♀ .2.

Legs of male: Femur is longest segment and bears 15-22 cement gland tubules ventrally, rows of setae present on both tibiae; tibia 2 longer than tibia 1. Second coxa approximately 3 times as long as its proximal diameter. Well developed processes situated on second coxae of fourth pair of legs; this process bears lateral fringe of curved setae like that found on distal palp segments. Process usually swollen, however, in some specimens distal surface confined within setiferous fringe may be collapsed, giving concave appearance. Propodus heavy, strongly curved, heel with two (or three) terminally crenulate spines. Number of heel spines inconstant. Sole armed with 5-7 spines. Terminal claw slender; auxiliaries absent. Genital pores not evident in male. In female, femur more swollen than that of male, propodus moderately slender; genital pores present on ventral surface of second coxae of all legs. In both sexes fourth pair of legs shorter than remaining pairs.

Measurements of holotype and allotype (mm): length trunk (frontal margin of cephalic segment to tip of abdomen) ♂ 2.35, ♀ 1.98; length cephalon ♂ 1.08, ♀ 1.05; greatest width cephalon ♂ .65, ♀ .61; length proboscis ♂ .59, ♀ .53; greatest width proboscis ♂ .38, ♀ .39; width across second lateral process ♂ 1.25, ♀ .98; diameter trunk ♂ .35, ♀ .33; length scape ♂ .48, ♀ .42; length palp ♂ first seg. .13, second seg. .5. Third leg: coxa 1 ♂ .45, ♀ .3; coxa 2 ♂ .59, ♀ .51; coxa 3 ♂ .4, ♀ .28; femur ♂ 1.25, ♀ 1.28; tibia 1 ♂ .98, ♀ .93; tibia 2 ♂ 1.10, ♀ 1.15; tarsus ♂ .12, ♀ .1; propodus ♂ .6, ♀ .54; claw ♂ .36, ♀ .35.

Remarks: The new species is clearly distinguished from all congeners by the shape and setation of the palps and also in possession of the well developed processes on the 2nd coxae of the 4th pair of legs in the male. With the exception of *P. stocki* Fage (in which the 2nd palp segment is slightly dilated), the 2nd palp segment in all species is slender, frequently narrowing to a constriction at 30-50% of its length. In *P. cyathus* the proximal portion is inflated dorsally with no constriction evident.

The tall mid dorsal setae found on the 2nd palp segment and the large coxal processes in the male are not present in any other member of the genus. The only other species bearing a heavy propodus is *P. crassimanus* Stock.

Propallene cyathus was found in vast numbers amongst colonies of the arborescent bryozoan *Vittaticella fusca?* (McGillivray) during a benthic survey conducted in November 1977 southwest of Seaspray for the Latrobe Valley Water and Sewerage Board. Examination of 347 adult individuals showed an extremely high percentage of fertile specimens; 92.9% of the males were ovigerous and 96.8% of the females were gravid. Only three specimens of *P. cyathus* were recorded from two previous surveys of the same station in March and August, 1977. In March 1977, one ovigerous male and two juvenile males were collected. No specimens were recorded from the latter survey. Such a high percentage of fertile specimens in November suggests a cyclic breeding pattern, and the complete absence of specimens just four months earlier, may indicate a migratory response to their reproductive activity. Hydrological studies by Newell (1961) indicate a seasonal reversal of current patterns in this region, and it is probable that the extent of migration is largely dependent on the Bass Strait current system. In many instances specimens were heavily encrusted with the epiphytic coralline alga *Heterodermu* sp.

Propallene vagus sp. nov.

FIG. 3A-N, FIG. 2C

Specimens Examined: Holotype: ♂ N.M.V. K46, 1 km southwest of Port Phillip Heads, Vic.; depth 30 m, coll. D. A. Staples 6.vi.1976.

Allotype: ♀ (grav.) N.M.V. K47. Paratypes: 1 ♂ (sub adult); 8 ♀ N.M.V. K48, 1 ♂ (sub adult), 2 ♀, private collection of author.

Description: Trunk segmented, strongly arched in male; neck more slender than in female; lateral processes longer than diameter of trunk and separated by less than their own diameter. Each lateral process bears dorsally 2, 3 (or 4) small distal spines, and 1 or 2 smaller spinules more proximally. Abdomen short, expanded at base, inclined ventrally. Ocular tubercle conical, more acute in male; four indistinct eyes; lateral sense organs present.

Chelifores scape one segmented bearing several scattered setae; both fingers curved, gaping when closed, movable finger with 6-7 teeth, immovable finger with 4-6 teeth, palm with several long setae.

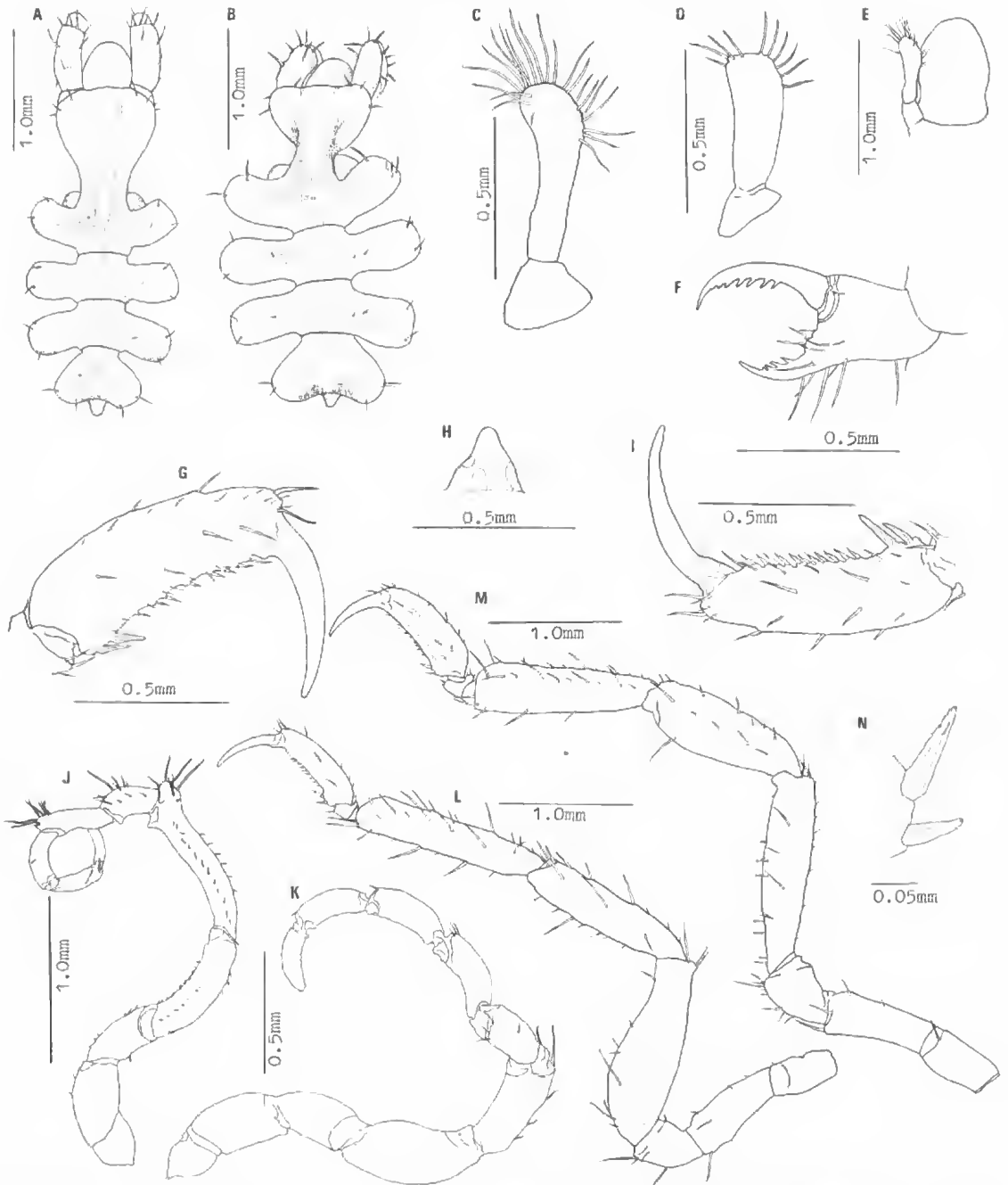


Fig. 3. *Propallene vagus* sp. nov. A, Trunk of female, dorsal; B, Trunk of male; dorsal; C, Palp, male; D, Palp, sub-adult, male; E, Palp and proboscis, male, ventral view; F, Chela, male; G, Propodus, male; H, Ocular, male; K, Oviger, female; L, Leg 3, female; M, Leg 3, male; N, Propodal heel spines, male.

Palps present only in male; 2-segmented, basal segment short and unarmed, second segment curved and swollen distally, a slight constriction present at about 30% of its length, measuring approximately $5\frac{1}{2}$ times its proximal

width. Armed distally with fringe of 20–30 setae.

Oviger of male: segment 10 of holotype damaged (terminal spines lacking), segment 5 longest, distally bearing setiferous lobe and

opposing pointed process, recurved spinules present on segments 3, 4 and 5; compound spines polymorphous (Fig. 2. C); proximal spines bear 12-16 pairs of lateral teeth, more or less of equal size; distal spines bear four pairs of heavily sclerotized basal teeth, terminal spine broader and shorter than remainder. Compound spine formula variable between specimens, spines on segments 7-10 of holotype according to formula 15:12:11:(12?). Segments 6 and 7 bearing several setae distally. Female oviger segment 4 longest, segment 5 without distal lobe and opposing process, recurved spinules absent; compound spine formula of allotype 13:12:11:13; shape of compound spines as in male.

Measurements of oviger segments (mm): 1 ♂ .18, ♀ .19; 2 ♂ .39, ♀ .33; 3 ♂ .38, ♀ .32; 4 ♂ .68, ♀ .57; 5 ♂ .90, ♀ .47; 6 ♂ .31, ♀ .33; 7 ♂ .38, ♀ .38; 8 ♂ .28, ♀ .34; 9 ♂ .32, ♀ .28; 10 ♂ damaged, ♀ .29.

Legs of male: Femur longest segment, tibia 2 longer than tibia 1, rows of setae present on both tibiae. Second coxa approximately three times proximal width. Propodus robust; moderately curved, heel with two spines in which crenulation is generally indistinct, sole armed with 10-11 spinules. Femur with 5-8 femoral cement glands. Genital pores not evident. Auxiliary claws absent. Female propodus less robust than in male; distal propodal heel spine more elongated than in male; femur swollen; genital pores present on second coxae of all legs.

Juvenile: Distinguishing features from adult male are smaller size and more compact and less setiferous palps.

Measurements of holotype and allotype (mm): length trunk (frontal margin of cephalic seg. to tip of abdomen), ♂ 2.98, ♀ 2.83; length cephalon ♂ 1.28, ♀ 1.63; greatest width cephalon ♂ .93, ♀ .99; length proboscis ♂ .76, ♀ .88, greatest width proboscis ♂ .55, ♀ .65; width across second lateral process ♂ 1.35, ♀ 1.3; diameter of trunk ♂ .43, ♀ .41; length scape ♂ .68, ♀ .73; length palp ♂ first seg. .19, second seg. .54. Third leg: coxa 1 ♂ .55, ♀ .55; coxa 2 ♂ .88, ♀ .75; coxa 3 ♂ .48, ♀ .43; femur ♂ 1.43, ♀ 1.64; tibia 1 ♂ 1.28, ♀ 1.3; tibia 2 ♂ 1.4, ♀ 1.45; tarsus ♂ .15, ♀ .13; propodus ♂ .8, ♀ .7; claw ♂ .48, ♀ .5.

Remarks: Superficially this species resembles *P. eyathus* sp. nov. in the general shape of the trunk and in the distal fringe of long setae on the second palp segment. It differs clearly,

however, in the absence of the coxal process on the 4th pair of legs, in the lower number of femoral cement gland ducts, and in the shape of the terminal palp segment, which also lacks the long mid-dorsal setae. With the possible exception of *P. similis* inadequately described from one male specimen by Barnard (1955) the combination of less than 10 cement gland ducts restricted to the femur, the 2nd coxa less than 4 times its basal diameter, lateral processes longer than the trunk diameter (and separated by less than their own diameter) distinguishes *P. vagus* from all congeners.

In the absence of further records of the male of *P. similis*, and Stock's inability to locate the holotype (Stock 1974), morphological data on this species are still inadequate. I am satisfied, however, that the following features are sufficient to justify the specific status of *P. vagus*: larger size (e.g., ♀ leg 3 of *P. similis* is 4.79 mm, that of *P. vagus* 7.45 mm), proportionately longer and more setiferous second palp segment (e.g., Barnard illustrates the second segment as approximately 7 times its basal diameter, with a small group of setae distally; *P. vagus* 5½ times, and with a dense fringe of long setae distally), stronger male propodus and the wider intervals between lateral processes. The specimens were first sighted tumbling over a sandy substrate in response to the strong tide flow at Port Phillip Heads. Because of their thigmotactic nature most specimens had attached themselves to small fragments of drifting detritus, the only identifiable piece of which was a portion of a colony of the arborescent bryozoan *Cornucopina grandis* (Busk).

The specific name, *vagus* (wandering) alludes to the situation in which the specimens were observed when collected.

The collection comprised only three males, two of which are sub-adult, and eleven females. The single mature male had remnants of cement adhering to the fifth oviger segment indicating that eggs had been carried. Of the 11 females, 10 were gravid, and the low number, or complete absence of eggs in some legs, suggested that eggs had recently been deposited.

Propallene saengeri sp. nov.

FIG. 4A-L, FIG. 2D

Specimens Examined: Holotype: ♂ (ovig.) Q.M. S195 Str 6.5.1 soft mud, Calliope River, Queensland 3 km upstream from mouth.

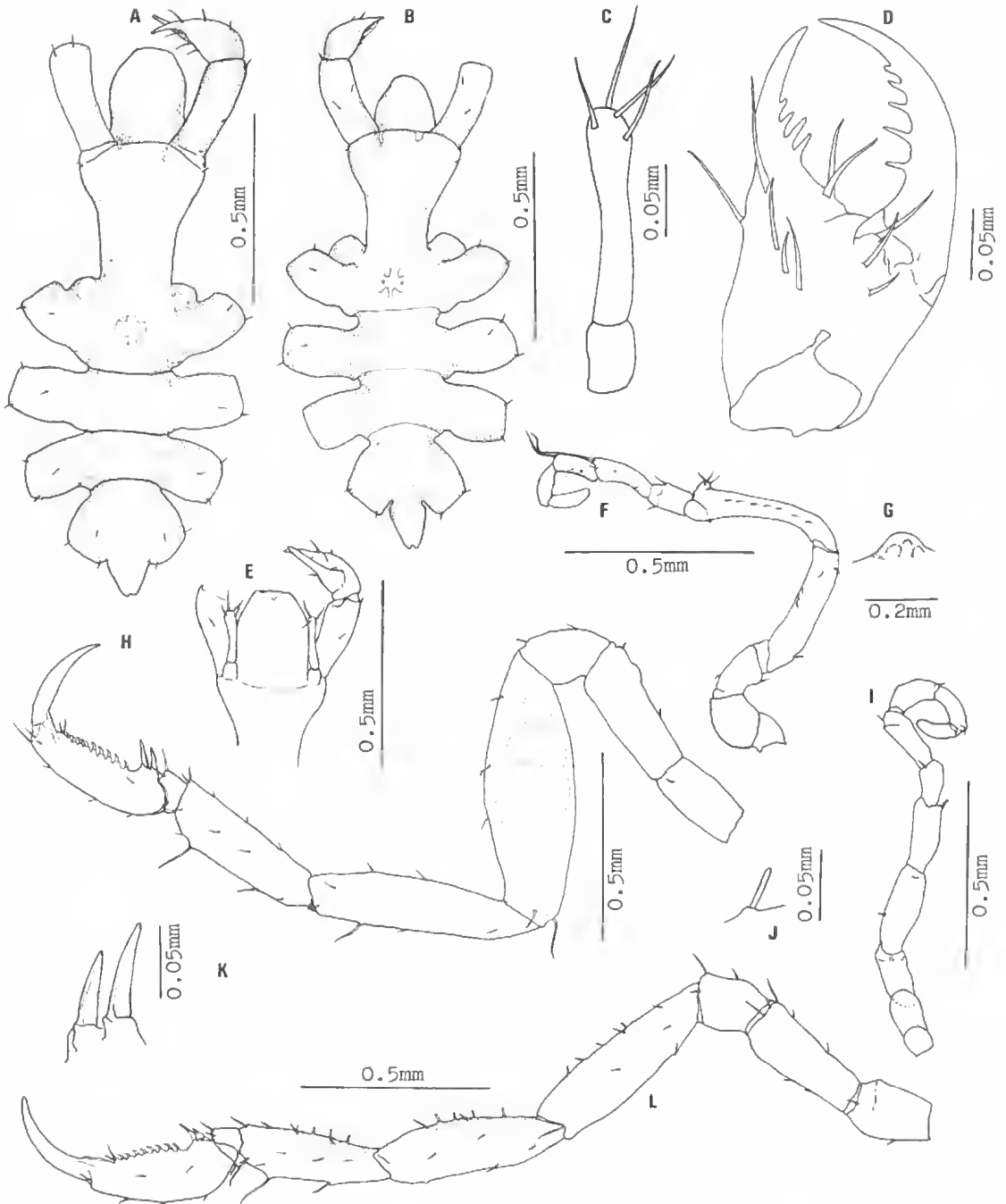


Fig. 4. *Propallene saengeri* sp. nov. A, Trunk of female, dorsal; B, Trunk of male, dorsal; C, Palp, male; D, Chela, male; E, Cephalic region, male ventral; F, OViger, male; G, Ocular tubercle, female; H, Leg 3, female; I, OViger, female; J, Cement gland duct, male; K, Propodal heel spines, female; L, Leg 3, male.

depth 2.1 m, coll. Queensland Electricity Generating Board, May 1976. *Allotype*: ♀ (grav.) Q.M. S196 Stn 8.11.5 soft mud, Calliope River, depth 2 m, coll. Q.E.G.B., Nov. 1976. *Paratypes*: 1 ♀ (grav.) Q.M. S197 Stn 7.11.1 fine mud with some detrital matter, Calliope River, Aug. 1976, 1.5 km upstream, depth 1.5 m, coll. Q.E.G.B. Aug. 1976. 1 ♀ (grav.) N.M.V. K49 Stn 7.11.4 coarse sand, mouth of Calliope River 1.5 km upstream, depth 4.8 m, coll. Q.E.G.B. Aug. 1976. 1 ♀ (grav.) Stn 8.11.5 soft mud, Calliope River, depth 2 m, coll. Q.E.G.B. Nov. 1976, lodged with Queensland Electricity Generating Board. 1 ♀ (grav.) Stn 8.9.5 soft mud, Calliope River, depth 2 m, coll. Q.E.G.B. Nov. 1976, lodged in author's private collection

Description: Trunk segmented, lateral processes shorter than diameter of trunk and separated by less than their own diameter. Each lateral process armed with one small seta situated almost mid dorsally, and 2 or 3 similar setae distally. Abdomen short, well developed for the genus, directed somewhat ventrally. Ocular tubercle: low, rounded, eyes indistinctly; pigmented lateral sense organs present.

Chelifores: scape 1-segmented; palm of chela armed with several setae. Immobile finger with four teeth, movable finger with five teeth. Both fingers curved, gaping when closed.

Palp only present in male; 2-segmented, basal segment short and unarmed. Distal segment approximately 3.5 times as long as basal segment and slightly greater than six times its own proximal diameter, armed distally with four long setae. No constriction evident.

Ovigers: In male, segment 5 longest. Distally this segment bears setiferous lobe with small and inconspicuous opposing tooth-like process. Recurved spinules present on segment 3, 4 and 5. Segment 7 bears 2 long setae reaching beyond segment 8. Compound spines on segments 7-10 according to formula 10:10:8:9. Compound spines polymorphous, proximal spines bear 7-9 lateral teeth of about equal size on either side. Distal spines bear two pairs of heavily sclerotized basal teeth; terminal spine broad and bears 2 large basal teeth on either side (Fig. 2 D). In female, segment 4 is longest, segment 5 without distal lobe and process, recurved spinules absent. Compound spine formula 12:10:9:11.

Measurements of oviger segments (mm): 1 ♂ .05, ♀ .04; 2 ♂ .12, ♀ .12; 3 ♂ .14, ♀ .14; 4 ♂ .29, ♀ .21; 5 ♂ .37, ♀ .19; 6 ♂ .07, ♀ .10;

7 ♂ .12, ♀ .17; 8 ♂ .11, ♀ .12; 9 ♂ .11, ♀ .10; 10 ♂ .10, ♀ .12.

Legs: Femur is longest segment; tibia 1 longer than tibia 2, sparsely setose; second coxa approximately 3.5 times as long as its proximal diameter; propodal heel with two terminally crenulate spines; sole with 8-10 spines. Auxiliary claws absent. Cement gland tubules present on femur, tibia 1 and tibia 2 of the male. Four tubules on tibia 1 of all legs, 4-6 femoral tubules and 3-4 on tibia 2. Genital pores not visible. In female, femur swollen to accommodate ovaries. Genital pores present on ventro-distal surface of second coxae of all legs.

Measurements of holotype and allotype (mm): length trunk (frontal margin cephalon to tip of abdomen) ♂ 1.1, ♀ 1.2; length cephalon ♂ .51, ♀ .6; greatest width cephalon ♂ .31, ♀ .35; length proboscis ♂ .27, ♀ .35; greatest width proboscis ♂ .2, ♀ .22; width across second lateral process ♂ .61, ♀ .62; diameter trunk ♂ .21, ♀ .24; length scape ♂ .22, ♀ .29; length palp ♂ first seg. .04, second seg. .15. Third leg: coxa 1 ♂ .17, ♀ .21; coxa 2 ♂ .32, ♀ .32; coxa 3 ♂ .15, ♀ .16; femur ♂ .49, ♀ .65; tibia 1 ♂ .45, ♀ .55; tibia 2 ♂ .36, ♀ .46; tarsus ♂ .06, ♀ .05; propodus ♂ .35, ♀ .38; claw ♂ .25, ♀ .28.

Remarks: The occurrence of cement gland ducts on leg segments additional to the femur is a notable feature previously recorded only in *Nymphon* and *Ascorhynchus*. In the absence of any mention of cement glands in descriptions of *P. similis* and *P. stocki*, it is not known whether this occurrence in *P. saengeri* is unique in the genus. Cement glands in all other members of the genus are confined to the femur.

The new species differs from *P. stocki* in the nature of the second palp segment which is longer (greater than 6 times as long as its basal diameter) and bears a fringe of long setae distally. In *P. stocki* the second palp segment is unarmed, and about 3 times as long as wide. *Propallene similis* differs from *P. saengeri* in larger size (e.g., leg 3 ♀ *P. similis* 4.79 mm, terminal claw excluded; leg 3 ♀ *P. saengeri* 2.78 mm, terminal claw excluded); higher number of teeth on the fingers of the chela; the strong constriction of the second palp segment (very slight in *P. similis*), and in having tibia 2 longer than tibia 1. In view of the variability noted by Stock (1975) in *P. longiceps*, however, the significance of this latter feature is uncertain.

The new species was named for Dr P. Saenger who forwarded the specimens for examination.

Diagnosis of Genus *Propallene*

Inclusion of the new species necessitates amendment to Stock's (1975) diagnosis of *Propallene*.

Trunk well segmented. Ocular tubercle in posterior part of cephalic segment. Abdomen small, implanted somewhat ventrad. Proboscis roughly of type D'. Scape 1-segmented. Palp only present in male. Ovipiger 10-segmented (♂, ♀). Segment 5 (♂) with distal apophysis and opposite distal hook-like or conical process. Compound spines present, in 1 row, proximal and distal spines on each segment very dissimilar in shape (♂, ♀). No terminal oviger claw (♂, ♀). Cement glands (♂) opening through numerous (5-22) short ducts on ventral surface of either femur alone or femur, tibia 1 and tibia 2. Propodal heel spines often crenulated, but frequently indistinct; no auxiliary claws.

Geographic distribution of *Propallene*

P. kempfi (Calman 1923), southeastern Asia; *P. longiceps* Bohm (1879b), Japan; *P.*

similis Barnard (1955), southern Africa; *P. ardua* Stock (1975b), eastern Africa, *P. craxsimanus* Stock (1959), southern and southeastern Africa; *P. stocki* Fage (1956), Sierra Leone; *P. crinipes* Stock (1968a), Straits of Malacca; *P. saengeri* sp. nov., northeastern Australia; *P. vagus* sp. nov., southeastern Australia; *P. cyathus* sp. nov., southeastern Australia.

Acknowledgments

I should like to express my gratitude to Dr P. Saenger, Queensland Electricity Generating Board; Mrs J. E. Watson, National Museum of Victoria, and the Latrobe Valley Water & Sewage Board, for entrusting their collections to me. Thanks are also due to Dr B. J. Smith, National Museum of Victoria for his assistance and advice. Dr B. F. Stratford and Mr P. G. Hollis, University of Melbourne for permission to use the scanning electron microscope and Mr P. E. Bock, Royal Melbourne Institute of Technology for his identification of the Bryozoa. I also wish to acknowledge the assistance given by the Science and Industry Endowment Fund, C.S.I.R.O.

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